Kentucky Energy and Environment Cabinet

Kentucky Division for Air Quality

Appendix L
Best Available Retrofit Technology (BART) Related Documentation

APPENDIX L

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PURPOSE

The purpose of this appendix is to outline the Kentucky strategy for complying with the requirements for establishing best available retrofit (BART) controls under 40 CFR 51.308(e) as part of our Regional Haze SIP. The BART requirements in 40 CFR 51.308(e) comprise a specific component of each state's first long term strategy (LTS). An overview of the first LTS covering from the present until 2018 is provided in Appendix H. This appendix includes a discussion of our strategy for developing the specific BART requirements. The discussion covers identification of BART-eligible sources, exemption modeling for BART eligible sources, and BART determinations for sources found to be subject to BART.

1. Background

As required by the CAA, EPA included in the final regional haze rule a requirement for Best Available Retrofit Technology (BART) for certain large stationary sources that were placed in operation between 1962 and 1977. The BART-eligible sources are those sources which have the potential to emit 250 tons or more of a visibility-impairing air pollutant, were placed in operation between August 7, 1962 and August 7, 1977, and whose operations fall within one or more of 26 specifically listed source categories. Under the CAA, BART is required for any BART-eligible source that a State determines "emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area." Accordingly, for stationary sources meeting these criteria, States must address the BART requirement when they develop regional haze SIPs.[1] EPA has set guidance for identifying BART-eligible sources in 40 CFR Part 51 Appendix Y.

A BART-eligible source that is responsible for a 1.0 deciview (dv) change or more is considered to "cause" visibility impairment. Although the appropriate threshold may vary, the guidelines state that the contribution threshold used for BART applicability should not be higher than 0.5 deciviews.[1] Thus a BART-eligible source that is responsible for a 0.5 dv change or more is considered to "contribute" to visibility impairment. Any source determined to cause or contribute to visibility impairment in any Class I area is subject to BART.

The guidelines direct that States should include SO2, NOx, and direct particulate matter (PM) emissions, including both PM10 and PM2.5, in determining whether sources cause or contribute to visibility impairment. States may use their best judgment to determine whether VOC or ammonia emissions are likely to have an impact on visibility in an area.[1]

To determine which BART-eligible sources are subject to BART, states have several options. A state may consider all BART-eligible sources subject to BART; may perform analysis showing that the full group of BART-eligible sources in a State cumulatively may not be reasonably anticipated to cause or contribute to any visibility impairment in any Class I areas; or may consider the individualized contribution of a BART-eligible source to determine whether a specific BART-eligible source is subject to BART.

Sources that are subject to BART must undergo a BART determination. Section 169A(g)(7) of the CAA requires that States must consider the following factors in making BART

determinations: (1) The costs of compliance, (2) The energy and non-air quality environmental impacts of compliance, (3) Any existing pollution control technology in use at the source, (4) The remaining useful life of the source, and (5) The degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.[1]

To demonstrate the degree of improvement in visibility from various BART control options, the States may run CALPUFF or another appropriate dispersion model to predict visibility impacts. Scenarios would be run for the pre-controlled and post-controlled emission rates for each of the BART control options under review. The maximum 24-hour emission rates would be modeled for a period of three or five years of meteorological data. States have the flexibility to develop their own methods to evaluate model results.[1]

2. Approach to Implementation of BART Requirements

In order to meet the SIP submittal deadline, Kentucky has used the following approach for the implementation of the federal regional haze rule BART requirements. The approach consists of source identification efforts; requests to sources for information; providing EPA guidance and information to the BART-eligible sources; participation in the VISTAS BART subgroup to resolve technical issues spanning states in the VISTAS region; and ongoing consultation with affected sources; and EPA and FLMs throughout the BART process.

As required by the Clean Air Act (CAA), Kentucky implemented BART for sources identified pursuant to the BART guidelines per 40 CFR Part 51 Appendix Y. It applies to sources that have the potential to emit 250 tons or more of a visibility impairing pollutant, were in existence on August 7, 1977 and began operation after August 7, 1962, and fall within one of the 26 industrial source categories listed in 40 CFR Part 51 Appendix Y guidelines. The federal rule allows affected sources to demonstrate that the source does not contribute to visibility impairment and should be exempted. Non-exempt sources are required to undergo a determination of best available retrofit technology. A copy of the July 6, 2005, *Federal Register*, that provided the BART final rule is available as Appendix L.1.

3. Identification of BART-eligible Sources

EPA provided guidance for identifying BART-eligible sources in 40 CFR Part 51 Appendix Y. Kentucky followed this guidance in identifying its BART-eligible sources. The Kentucky 2002 air emissions inventory was reviewed to determine the population of potential BART-eligible sources. The data were initially queried for any sources emitting SO2, NOx, PM-10, VOC, or ammonia. The data set was refined based on emissions, whether emission units fit in any of the twenty-six listed source categories for BART, and available date information obtained through review of permit and inspection reports and discussion with permits section and regional office staff familiar with the facilities.

Letters to the potential BART-eligible sources were sent to sources requesting information to verify whether the source was BART-eligible based on the federal BART guidelines, which included the source's potential emissions, source category and date criteria. Letters and correspondence to sources are available as Appendix L.2.

Through this iterative review process, the list of potential BART-eligible sources was pared down to twenty-six BART-eligible sources listed below. The facilities are scattered throughout the state with closest facility proximity to Class I areas ranging from an estimated 63 km to 290 km. The facilities include two primary aluminum facilities, one paper manufacturer, fourteen electric utilities, one steel manufacturer, one primary metal (coke) manufacturer, two coal preparation plants, one oil refinery, and three chemical manufacturers. The following Table 3-1 provides the list of BART-eligible sources in Kentucky. This list is also available in Appendix L.3.

Table 3-1 Kentucky BART-Eligible Sources

Sources	Source ID	County
American Electric Power Big Sandy Plant	2112700003	Lawrence
AK Steel Corp. - Coke Mfg Plant	2101900027	Boyd
AK Steel Corporation - Steel Plant	2101900005	Boyd
Alcan Primary Products Corporation	2110100029	Henderson
Arch Chemicals Inc.	2116300001	Meade
Calgon Carbon Corporation	2101900014	Boyd
Century Aluminum	2109100004	Hancock
Commonwealth Aluminum Lewisport LLC	2109100010	Hancock
Duke Energy East Bend Station	2101500029	Boone
E.ON KU/LGE Brown Station	2116700001	Mercer
E.ON KU/LGE Cane Run Station	2111100126	Jefferson
E.ON KU/LGE Ghent Station	2104100010	Carroll
E.ON KU/LGE Mill Creek Station	2111100127	Jefferson
East Kentucky Power Cooperative Cooper Station	2119900005	Pulaski
East Kentucky Power Cooperative Spurlock Station	2116100009	Mason
Henderson Power and Light	2110100012	Henderson
Marathon Petroleum Company Refinery	2101900004	Boyd
Martin County Coal Corporation	2115900002	Martin
NewPage Corporation Wickliffe Paper Company	2100700002	Ballard
Owensboro Municipal Utilities	2105900027	Daviess
Pinnacle Processing Inc.	2115900004	Martin
TVA Paradise Plant	2117700006	Muhlenberg
Western Kentucky Energy Coleman Station	2109100003	Hancock
Western Kentucky Energy Green Station	2123300052	Webster
Western Kentucky Energy Reid/Henderson Station	2123300001	Webster
Westlake Vinyls Inc.	2115700039	Marshall

A table of Kentucky's BART-eligible sources and VISTAS 2002 SO2 emissions and distance to Class I areas is available in Appendix L.3.

Kentucky opted to consider its BART-eligible sources subject to BART unless the sources demonstrated exemption via modeling. Kentucky BART-eligible sources were provided the

opportunity to submit modeling demonstrations showing that they did not contribute to visibility impairment, i.e., had less than 0.5 deciviews (dv) impact, on any Class I area within 300 km and thus could be exempt.

4. Contribution Threshold

Determining whether a source causes or contributes to visibility impairment is one step in the BART review process. The *Guidelines for BART Determinations Under the Regional Haze Rule* (40 CFR 51, Appendix Y, Section III.A.1) state that "A single source that is responsible for a 1.0 deciview change or more should be considered to 'cause' visibility impairment." The guideline document also states that "the appropriate threshold for determining whether a source 'contributes to visibility impairment' may reasonably differ across states," but, "As a general matter, any threshold that you use for determining whether a source 'contributes' to visibility impairment should not be higher than 0.5 deciviews." The rationale for these instructions is provided in the preamble to the BART guidance, in the statement, "If 'causing' visibility impairment means causing a humanly perceptible change in visibility in virtually all situations (*i.e.* a 1.0 deciview change), then 'contributing' to visibility impairment must mean having some lesser impact on the conditions affecting visibility that need not rise to the level of human perception." (70 FR 39120, footnote 31). The guidance document itself also states that, "States remain free to use a threshold lower than 0.5 deciviews if they conclude that the location of a large number of BART-eligible sources within the State and in proximity to a Class I area justify this approach."

The EPA's documents strive to set these thresholds in the context of the human perception of visibility change. As noted above, the EPA considers a 1.0-deciview change in visibility to be humanly perceptible "in virtually all situations." Also, the preamble to the BART guidance (70 FR 39119, Footnote 28) cites an analysis in an appendix of a NAPAP (National Acid Precipitation Assessment Program) report, which asserts that "changes in light extinction of 5 percent will evoke just noticeable changes in most landscapes."[2] (A 5% change is approximately 0.5 dv.) But, as noted above, the preamble also states that perceptibility is not a prerequisite for choosing a contribution threshold. Putting all this together, it appears that "causing" visibility impairment means having a humanly perceptible impact (for which EPA considers the practical threshold to be 1.0 dv) while "contributing" to visibility impairment means having a smaller impact (for which EPA considers the threshold to be 0.5 dv or some smaller value) that may or may not be perceptible.

The EPA argues that a contribution threshold of less than 0.5 dv impact per source is appropriate when multiple sources contribute, in order to limit the combined effect of these sources. As an example, EPA asserts that if there were 100 sources, each affecting visibility by 0.1 dv (presumably an imperceptible amount), their total impact would be 10 dv, which can be expected to be quite perceptible (70 FR 39121. 1st column). The point remains that multiple sources can cause a larger impact than a single one. For BART purposes, visibility impacts are calculated as 24-hr averages of 1-hr plume impacts, so if the plumes from the various sources each impact the point of interest at some time during a 24-hr period (not necessarily all at the same hour) then the 24-hr average will reflect their combined impact.

KYDAQ concluded that the EPA suggested contribution threshold of 0.5 dv was appropriate in this situation since there are a limited number of in and out of state sources that impact the various Class I areas in the state. In addition there are a limited number of sources in close proximity to each of the Class I areas. Considering results of the visibility impacts modeling conducted (see Section 7), a 0.5 dv threshold was appropriate and a lower threshold was not warranted since the majority of the visibility impacts were well below 0.5 deciviews. Also even though several sources impacted each Class I area, the overall impacts were low from the sources.

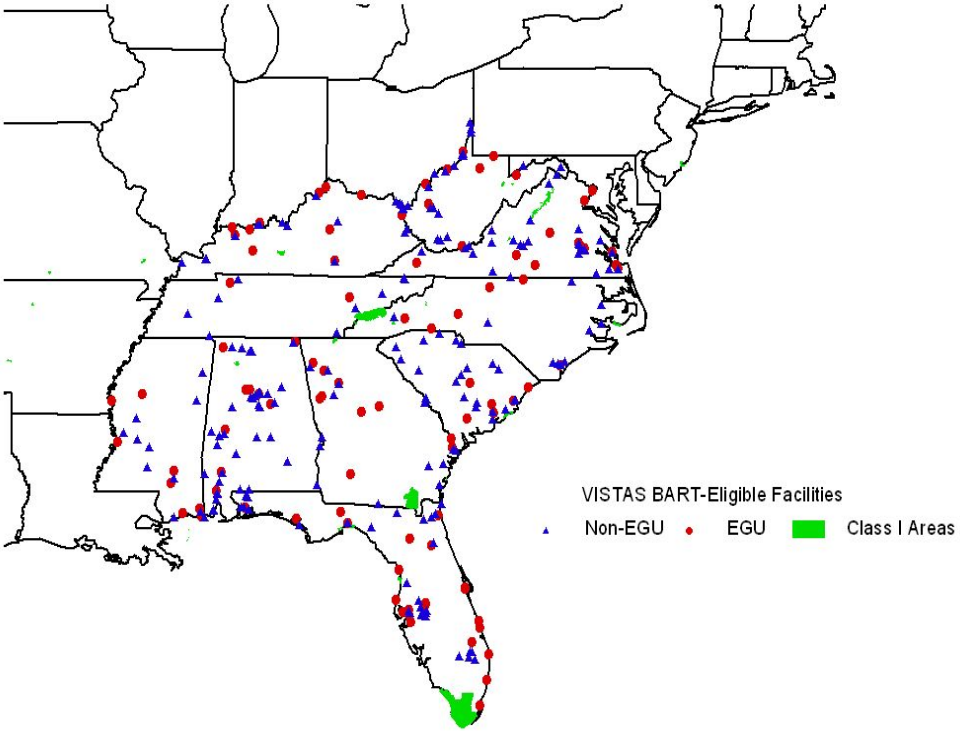

Figure 4-1. Location of VISTAS BART-Eligible Sources

5. Exemption of Point Source Volatile Organic Compounds for BART Purposes

Kentucky has determined through modeling that Volatile Organic Compounds (VOC) from point sources are not anticipated to cause or contribute significantly to any impairment of visibility in Class I areas and should be exempt for BART purposes.

5.1 Method

Kentucky has determined through modeling that VOCs from point sources are not anticipated to cause or contribute significantly to any impairment of visibility in Class I areas.

Modeling was conducted through The Visibility Improvement State and Tribal Association of the Southeast (VISTAS). VISTAS is a collaborative effort of state governments, tribal governments, and various federal agencies established to initiate and coordinate activities associated with the management of regional haze, visibility and other air quality issues in the Southeastern United States. VISTAS contracted with Georgia Institute of Technology to perform model sensitivity runs to determine the impact of point source VOCs on visibility in Class I areas.

Georgia Tech performed emission sensitivities to examine the impact of emission reductions on regional haze, annual PM2.5, and 8-hour ozone concentrations using CMAQv4.4_SOAmods on the VISTAS 12 km modeling domain, using the 2009 OTW (on the way) BaseD emissions. One such sensitivity run reduced anthropogenic, point source VOCs by 100%. The purpose was to quantify the impact of VOC emissions from VISTAS BART sources on Class I areas. The percent of BART-eligible to total point source emissions in Kentucky is 8%.[3] Two episodes were examined: June 1-July 10, 2002 and November 19 – December 19, 2002. The approach included calculating the extinction coefficient in dv (deciviews), then determining the maximum impact of point source VOCs. The chart below, taken from the VISTAS report *BART in the VISTAS Region: Sensitivity to VOC, NH3, and Primary PM Emissions*, included as Appendix L.4, shows the impact on the following twenty-two Class I areas within the VISTAS domain. [3]

BRET = Breton, LA
BRIG = Brigantine NWR, NJ
CACR = Caney Creek, AR
CHAS = Chassahowitzka, FL
COHU = Cohutta, GA
DOSO = Dolly Sods, WV
EVER = Everglades, FL
GRSM = Great Smoky Mountains National Park
HEGL = Hercules Glade, MO
JARI = James River Face, VA
LIGO = Linville Gorge, NC
MACA = Mammoth Cave, KY
MING = Mingo, MO
OKEF = Okefenokee, GA
ROMA = Cape Romain, SC
SAMA = Saint Marks, FL
SHEN = Shenandoah, VA
SHRO = Shining Rock, NC
SIPS = Sipsey Wilderness, AL
SWAN = Swanquarter, NC
UPBU = Upper Buffalo Wilderness, AR
WOLF = Wolf Island, GA

Maximum Point VOC Impact

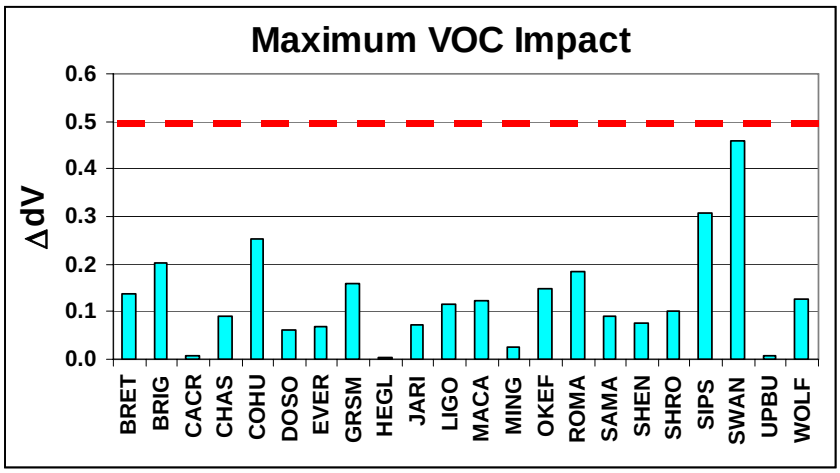

Figure 5-1. Maximum Point VOC Impact

5.2 Conclusions

The results show that the maximum impact from eliminating all point source VOC emissions in the VISTAS 12 km domain is less than a 0.5 dv for all Class I areas in the VISTAS domain. Given that the fraction of the total point source VOC emissions that are also BART-eligible in the state of Kentucky is just 8%[3], the expected impact of controlling VOCs from a BART source would be much less than the 0.5 dv threshold. VISTAS and Kentucky conclude that VOCs from point sources are not a visibility impairing pollutant for BART purposes and that BART-eligible sources do not need to consider VOC emissions.

6. Treatment of Ammonia Emissions for BART Purposes

Similar to its treatment of VOCs, EPA guidance allows States the discretion to decide whether or not ammonia emissions are to be considered for BART purposes based on evaluations of the contributions of the emissions to haze at Class I areas in their areas of influence. One approach a State can use to determine whether applying BART will be needed is to evaluate the haze impacts of all current emissions from all BART-eligible sources in the State. If the impact from all sources in the state is less than the contribution threshold established by the State, 0.5 dv for Kentucky, then source by source analysis for BART is not needed.

Kentucky has determined through modeling that with one exception ammonia (NH3) emissions from point sources are not anticipated to cause or contribute significantly to any impairment of visibility in Class I areas and should be exempt for BART purposes.

6.1 Method

Kentucky has determined through modeling that ammonia emissions from point sources are not anticipated to cause or contribute significantly to any impairment of visibility in Class I areas with the exception of one large point source that is approximately 400 km south and west of Mammoth Cave.

VISTAS contracted with Georgia Institute of Technology to perform model sensitivity runs to determine the impact of point source ammonia on visibility in Class I areas.

Georgia Tech performed emission sensitivities to examine the impact of emission reductions on regional haze using CMAQv4.5 with SOA mods on the VISTAS 12 km modeling domain, using the VISTAS 2009 OTW (on the way) Base F4 emissions. One such sensitivity run reduced, BART-eligible source ammonia by 100%. The purpose was to quantify the impact of ammonia emissions from VISTAS BART sources on Class I areas. Two episodes were examined: June 1-July 10, 2002 and November 19 – December 19, 2002. The approach included calculating the extinction coefficient in dv (deciviews), then determining the maximum impact of BART-eligible source ammonia. The chart below, taken from the VISTAS report *BART in the VISTAS Region: Sensitivity to VOC, NH3, and Primary PM Emissions*, included as Appendix L.4, shows the impact on the following twenty-two Class I areas within the VISTAS domain. [3]

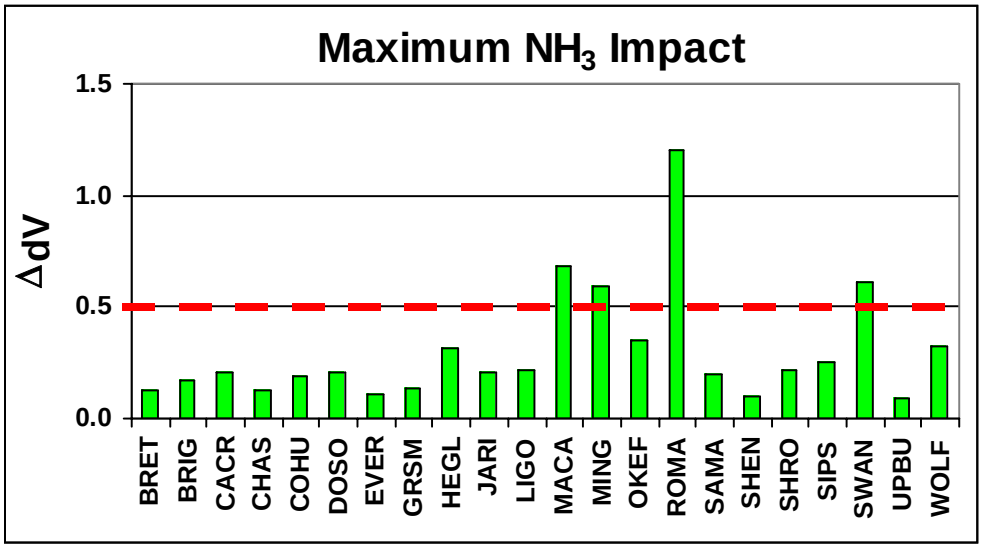

Figure 6-1. Maximum NH3 Impact - Maximum contributions of all BART-eligible NH_3 point sources in the VISTAS region to haze in Class I areas during the CMAQ-modeled periods. Note that in this graphic the maximum ammonia impact at Cape Romain may be overestimated as a result of an emissions error discovered after its generation.

The chart shows the largest haze impact in delta dv over the two timeframes at each Class I area. These delta dv changes represent the haze contribution of all BART source ammonia emissions relative to assumed natural haze levels. The natural haze levels are based on EPA-default annual average natural concentrations for the East and monthly-varying "climatologically representative" relative humidity at each Class I area. During the periods modeled the ammonia

emissions from all BART-eligible sources contributed more than 0.5 dv to haze at Mammoth Cave National Park (MACA), Kentucky; Mingo Wilderness (MING), Missouri, Cape Romain National Wildlife Refuge Area (ROMA) South Carolina, and Swanquarter National Wildlife Refuge (SWAN), North Carolina.

The majority of ammonia emissions in the VISTAS region come from four BART-eligible sources as shown in Table 6-1 below.

Table 6-1. Major BART NH_3 Sources in the VISTAS Region

Facility	State	NH_3 Emissions (tpy)	Distance to Nearest Class 1 Area (km)
Meadwestvaco Corp.	SC	130	30
PCS Phosphate	NC	206	31
PCS Nitrogen	TN	1252	180
PCS Nitrogen	GA	1765	220

Analysis of spatial and temporal distributions of ammonia concentrations indicates that the likely point source ammonia contributor to Mammoth Cave is the PCS Nitrogen Plant to the south and west near Memphis Tennessee.

6.2 Conclusions

The BART requirements of the regional haze rule allow states to determine whether or not ammonia is to be considered a visibility impairing pollutant to be addressed for BART purposes. NH3 emissions from BART sources may impair visibility; however the majority of NH3 emissions in the VISTAS region are from a few BART sources. Removal of the large NH3 emission sources results in minimal impact on visibility at Class I areas in the VISTAS region. At their discretion states may ask those few large sources to evaluate NH3 impacts and potential controls for NH3. Based on the CMAQ sensitivity analyses of the impact of ammonia emissions, the State determined that only one large TN source of ammonia emissions, PSC Nitrogen Plant, would be the likely contributor to Mammoth Cave visibility regarding ammonia. The PSC Nitrogen Plant has the potential to emit of at least 1,252 tons per year. Thus, this source's ammonia emissions were included in the PSC Nitrogen BART exemption modeling. A Tennessee air pollution control staff related to KYDAQ that PSC Nitrogen did model below 0.5 dv pursuant to the source's BART exemption modeling. Requiring the remaining smaller point sources of ammonia emissions to model ammonia impacts is not necessary.

7. Explanation of BART Exemption Modeling

7.1 Background

Kentucky opted to consider its BART-eligible sources subject to BART unless the source demonstrated exemption via modeling. BART-eligible sources can be excluded from BART determinations by demonstrating that the source cannot be reasonably expected to cause or contribute to visibility impairment in a Class I area. The threshold for determining that a source causes visibility impairment is set at 1.0 dv change from natural conditions over a 24 hour averaging period. The BART guidelines also propose that the threshold at which a source may "contribute" to visibility impairment should not be higher than 0.5 deciviews; however, depending on factors affecting a specific Class I area it may be set lower than 0.5 deciviews.

As stated in the BART regulation EPA's preferred approach for determining cause or contribution is an assessment with an air quality model such as CALPUFF or other appropriate model followed by comparison of the estimated 24-hour visibility impacts against a threshold above estimated natural conditions to be determined by the State. EPA recommends that the 98th percentile value from the modeling be compared to the State's chosen contribution threshold to determine if a source does not contribute to visibility impairment and thus is not subject to BART. Comparison of the 98th percentile value to the threshold must be made for each Class I area. For an annual period, this implies the 8th highest 24-hr value at a particular Class I area is compared to the contribution threshold. For a 3-year modeling period, the 98th percentile value may be interpreted as the highest of the three annual 98th percentile values at a particular Class I area or the 22nd highest value in the combined three year record, whichever is more conservative.

Kentucky worked with the regional planning organization (RPO) VISTAS on development of the VISTAS *Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)* (available in Appendix L.5). The common protocol was established to provide the basis for a common understanding among the organizations performing BART analyses or reviewing BART modeling results in the VISTAS region.

The VISTAS protocol describes common procedures for carrying out air quality modeling to support BART determinations that are consistent with the 40 CFR Part 51 Appendix Y guidelines. The protocol provides a consistent model, CALPUFF, and modeling guidelines for BART determinations, clearly delineated modeling steps, a common CALPUFF configuration, guidance for site-specific modeling, and common expectations for reporting model results. Details of the CALPUFF system can be found in Chapter 3 of the VISTAS protocol, specific recommendations for its application for BART purposes are found in Chapter 4, and specific information that should be included in site-specific protocols is found in Chapter 5.

VISTAS contracted EarthTech (now TRC) to develop a version of the CALPUFF model appropriate for BART purposes. The VISTAS version of the CALPUFF model is CALPUFF Version 5.754 and CALMET Version 5.7.

For BART modeling purposes VISTAS made publicly available 12-km CALMET output files for the entire VISTAS modeling domain (eastern United States) and provided CALMET output

files for five 4-km grid subdomains covering the VISTAS states and VISTAS Class I areas. To generate the CALMET input files, the VISTAS contractor used the MM5 databases developed by EPA for 2001, VISTAS for 2002, and Midwest RPO for 2003. For the 12 km grid large domain covering the entire VISTAS region, the No-Obs setting was used. For the 4 km grid available surface and upper air observations were used in addition to MM5 meteorological model outputs. Specific model settings were provided with the CALMET files and via the CALPUFF website so that work could be replicated.

For CALPUFF modeling, source emissions were to be defined using the maximum 24-hour actual emission rate during normal operation for the most recent 3 or 5 years. If maximum 24-hour actual emissions were not available, continuous emission data, permit allowable emissions, potential emissions, and emission factors from AP-42 source profiles could be used as available.

Key points on specific CALPUFF, CALPOST, and POSTUTIL configuration that were to be used for BART modeling are:

- After running CALPUFF for an individual facility, NO3 should be repartitioned in POSTUTIL.
- Ozone data from non-urban monitors should be used as the background ozone input.
- The Pasquill-Gifford dispersion method should be used.
- In CALPOST Method 6 with monthly average RH for calculating extinction as recommended by EPA should be used.
- EPA default calculations of light extinction under current and natural background conditions should be used. In addition a source may also calculate visibility using the recently revised IMPROVE algorithm.

Additional discussion of the CALPUFF model and VISTAS recommended settings can be found in the VISTAS protocol in Appendix L.5.

7.2 Kentucky BART Sources Exemption Modeling

KYDAQ requested that its sources follow the VISTAS modeling protocol in development of their site specific protocols and explain any deviations that they proposed to use. In the site-specific modeling demonstrations submitted by Kentucky's BART-eligible sources, the CALPUFF model incorporating three years of pre-processed MM5 meteorological data was used to evaluate the deciview change compared to natural background conditions at each of the Class 1 areas within 300 km of the source. The 12 km and/or 4 km MM5 datasets prepared by VISTAS were used. For exemption modeling using the 12 km dataset with no obs, per the VISTAS protocol, the maximum delta-deciview (dv) value was determined at each Class I area and compared to the 0.5 dv contribution threshold. For exemption modeling using the 4 km dataset, the 98^{th} percentile delta-deciview (dv) value was determined at each Class I area and compared to the 0.5 dv contribution threshold.

Seventeen of twenty-six Kentucky facilities submitted site-specific modeling protocols and subsequent modeling demonstrations based upon the VISTAS modeling protocol. Exemption modeling for nine Kentucky BART-eligible sources was conducted by the VISTAS contractor

using the VISTAS common protocol. The BART site-specific modeling protocols are found in Appendix L.5 and the BART exemption modeling demonstrations are found in Appendix L.6 The BART modeling protocols were reviewed by KYDAQ staff that worked with and shared the BART protocols with both EPA and FLMs for their review and comment. Their comments were shared with the facilities and addressed before the modeling was conducted.

All of the individual facility BART exemption modeling demonstrations are being provided in this Regional Haze SIP submittal. Resulting changes in response to protocol comments are reflected in the exemption modeling demonstration (see Appendix L.6) and/or the modeling protocol (see Appendix L.5) submitted by each facility. KYDAQ staff reviewed the demonstrations to determine whether the sources have less than 0.5 deciview (dv) impact on any Class I area within 300 km of the source. Sources demonstrating less than 0.5 dv impact are considered exempt. Sources contributing 0.5 dv impact or greater are considered subject to BART and required to proceed to a BART determination analysis of what control measures, if any, constitute BART for the source.

Review of the demonstrations submitted led to the determination that the BART-eligible source(s) at each facility in Table 7-1 should be exempt from BART determination requirements. All of the facilities in Table 7-1 were able to demonstrate exemption from BART using the old IMPROVE equation with the exception of one facility that is identified as using the new IMPROVE equation exclusively for its BART exemption. Table 7-1, provides Kentucky BART exemption modeling demonstrations that utilized the maximum delta-deciview value for all 12 km exemption modeling per the VISTAS protocol or for 4 km exemption modeling that utilized the 98th percentile value represented by 8th highest dv value over a three year period, which was more conservative over a three-year period. Based upon these exemption modeling demonstration results, KYDAQ proposes the exemption of all twenty-one facilities listed in Table 7-1 and available in Appendix L.7. Two of the facilities are primary aluminum facilities, one a paper manufacturer, fourteen electric utilities, one steel manufacturer, one primary metal (coke) manufacturer, two are coal preparation plants, one an oil refinery, and three are chemical manufacturers.

Table 7-1. Kentucky BART Exemption Modeling Results For Sources Exempted From BART

Source	Class I Area	Impact (Change in DV)	Modeling
Duke Energy East Bend Station	Mammoth Cave (210 km)	0.242	12 km Max dv value
Owensboro Municipal Utilities	Mammoth Cave (93 km)	0.432	4km 8th Highest dv value
	Mingo (289 km)	0.053	4km 8th Highest dv value
AK Steel Corporation - Steel Plant	Dolly Sods (287 km)	0.346	4km Max dv value
	James River Face (295 km)	0.386	4km Max dv value
	Linville Gorge (293)	0.358	4km Max dv value
	Otter Creek (261)	0.442	4km Max dv value
	Great Smokey Mt. (308 km)	0.190	4km 8th Highest dv value
AK Steel Corp. – Coke Mfg Plant	Dolly Sods (282 km)	0.180	12 km Max dv value
	Great Smokey Mt. 1 (304 km)	0.262	12 km Max dv value
	James River Face (288 km)	0.182	12 km Max dv value
	Linville Gorge (287 km)	0.155	12 km Max dv value
	Otter Creek (257 km)	0.208	12 km Max dv value
Martin County Coal Corporation	Dolly Sods1 (305 km)	0.068	12 km Max dv value
	Great Smokey Mt. (226 km)	0.135	12 km Max dv value
	James River Face (265 km)	0.085	12 km Max dv value
	Joyce Kilmer-Slickrock (285 km)	0.121	12 km Max dv value
	Linville Gorge (207 km)	0.131	12 km Max dv value
	Otter Creek (280 km)	0.077	12 km Max dv value
	Shining Rock (259 km)	0.103	12 km Max dv value
Pinnacle Processing Inc.	Great Smokey Mt. (235 km)	0.108	12 km Max dv value
	James River Face (262)	0.070	12 km Max dv value
	Joyce Kilmer-Slickrock (294 km)	0.053	12 km Max dv value
	Linville Gorge (214 km)	0.077	12 km Max dv value
	Otter Creek (272 km)	0.015	12 km Max dv value
	Shining Rock (268 km)	0.021	12 km Max dv value
Arch Chemicals Inc.	Mammoth Cave (83 km)	0.417	4km 8th Highest dv value
Commonwealth Aluminum Lewisport LLC	Mammoth Cave (94 km)	0.489	12 km Max dv value
	Mingo (304 km)	0.052	12 km Max dv value
Henderson Power and Light	Mammoth Cave (134 km)	0.302	12 km Max dv value
	Mingo (238 km)	0.084	12 km Max dv value
Calgon Carbon Corporation	Dolly Sods (284 km)	0.133	12 km Max dv value
	Great Smokey Mt. (290 km)	0.191	12 km Max dv value
	James River Face (282 km)	0.098	12 km Max dv value
	Linville Gorge (273 km)	0.103	12 km Max dv value
	Otter Creek (259 km)	0.157	12 km Max dv value
Westlake Vinyls Inc.	Mammoth Cave (183 km)	0.150	12 km Max dv value
	Mingo (156 km)	0.167	12 km Max dv value
	Sipsey1 (309 km)	0.084	12 km Max dv value
Century Aluminum*	Mammoth Cave (100 km)*	0.446	4km 8th Highest dv value
Alcan Primary Products Corporation	Mammoth Cave (118 km)	0.467	4km 8th Highest dv value
	Mingo (244 km)	0.184	4km 8th Highest dv value

Table 7-1. Kentucky BART Exemption Modeling Results For Sources Exempted From BART

Source	Class I Area	Impact (Change in DV)	Modeling
NewPage**Corporation Wickliffe PaperCo.	Mammoth Cave (250 km)**	0.102	4km 8th Highest dv value
	Mingo (91 km)	0.291	4km 8th Highest dv value
	Sipsey (319 km)	0.060	4km 8th Highest dv value
Western Kentucky Energy Coleman Station	Mammoth Cave (91 km)	0.368	4km 8th Highest dv value
Western Kentucky Energy Reid/Henderson Station***	Mammoth Cave (118 km)	0.464***	***4km 8th Highest dv value
	Mingo (244 km)	0.072	4km 8th Highest dv value
Western Kentucky Energy Green Station	Mammoth Cave (118 km)	0.217	4km 8th Highest dv value
	Mingo (244 km)	0.039	4km 8th Highest dv value
Marathon Petroleum Company	Dolly Sods (287 km)	0.055	12 km Max dv value
	Great Smokey Mt. (293 km)	0.056	12 km Max dv value
	James River Face (287 km)	0.079	12 km Max dv value
	Linville Gorge (276 km)	0.041	12 km Max dv value
	Otter Creek (261 km)	0.086	12 km Max dv value
E. ON U.S. Brown Station	Mammoth Cave (130) km)	0.410	4km 8th Highest dv value
	Great Smokey Mt. (250 km)	0.210	4km 8th Highest dv value
	Joyce Kilmer-Slickrock (265 km)	0.153	4km 8th Highest dv value
E. ON U.S. Cane Run Station	Mammoth Cave (100) km)	0.378	4km 8th Highest dv value
E. ON U.S. Ghent Station	Mammoth Cave (190) km)	0.292	4km 8th Highest dv value

*Century Aluminum and **NewPage modeled below 0.5 dv with and without the new improve equation. ***Western Kentucky Energy Reid/Henderson Station BART exemption modeling was based exclusively on the use of the new improve equation. A copy of a request to EPA Region 4 requesting approval of the use of the new improve equation and a letter from EPA granting its approval of the request for these three sources are available in Appendix L.9. The modeled values in the above table for Century Aluminum and NewPage are for the old improve equation. The values for Western Kentucky Energy Reid/Henderson are for the new improve equation.

Consistent with BART regulation requirements and EPA guidance, BART-eligible sources at electric utilities complying with EPA's Clean Air Interstate Rule (CAIR) that wished to demonstrate exemption were allowed to model only PM emissions. Compliance with CAIR constitutes BART for these sources for emissions of NOx and SO2.

Kentucky adopted its CAIR regulations with state effective dates of February 2, 2007, and June 13, 2007. KYDAQ submitted its CAIR State Implementation Plan (SIP), which included the CAIR regulations, to EPA Region 4 for SIP approval on April 4, 2007. Kentucky is expecting approval of its CAIR SIP in the near future. Kentucky's CAIR regulations are available in Appendix H.7.

As previously noted, fourteen of Kentucky's twenty-six BART-Eligible sources are electric generating units (EGUs). All of Kentucky's BART-eligible EGUs are subject to CAIR. Most of these sources have already installed or are installing SO2 controls. A table that summarizes the existing and expected Kentucky EGU controls, including BART EGUs, is available in Appendix L.8.

Five of the Kentucky's twenty-six BART-eligible facilities were unable to demonstrate less than 0.5 dv impact via modeling. All five facilities were EGUs. The 4 km exemption modeling visibility impact results for these five facilities are included in Table 7-2. For the exemption modeling, the five EGU sources were required to model only PM emissions. In each case the 98th percentile represented by the 8th highest value over a 3 year period was the more conservative result and was compared to the 0.5 dv exemption threshold.

Table 7-2. Kentucky BART Exemption Modeling Results for BART-Subject Sources.

Source	Class I Area	Impact (Change in DV)	Modeling
East Kentucky Power (EKPC) Cooperative Spurlock Station	Mammoth Cave (251 km)	1.834	4km 8th Highest dv value
East Kentucky Power (EKPC) Cooperative Cooper Station	Mammoth Cave (130 km)	7.376	4km 8th Highest dv value
	Great Smoky Mountains National Park (162 km)	6.763	4km 8th Highest dv value
	Joyce Kilmer-Slickrock Wilderness (178 km)	4.974	4km 8th Highest dv value
	Cohutta Wilderness Area (221 km)	3.363	4km 8th Highest dv value
	Shinning Rock (233 km)	2.022	4km 8th Highest dv value
	Linville Gorge Wilderness Area (267 km)	1.885	4km 8th Highest dv value
TVA Paradise Fossil Steam Plant	Mammoth Cave (63 km)	3.93	4km 8th Highest dv value
	Mingo (283 km)	0.865	4km 8th Highest dv value
American Electric Power (AEP) Big Sandy Plant	Dolly Sods (291 km)	1.027	4km 8th Highest dv value
	James River Face (279 km)	1.052	4km 8th Highest dv value
	Linville Gorge (256 km)	0.835	4km 8th Highest dv value
	Otter Creek (266 km)	1.285	4km 8th Highest dv value
E. ON U.S. Mill Creek Station	Mammoth Cave (90 km)	2.265	4km 8th Highest dv value

7.3 BART Sources in Other States Within 300 km of Kentucky's Class I Area

The authority and responsibility for conducting BART analyses under the regional haze rule lies with the state in which the BART eligible source is located. Sources must conduct an analysis of their impact on any Class I area within 300 km of the source. At this time the VISTAS states are

at various points in their processes for addressing BART. For information regarding BART sources outside of Kentucky within 300 km of Kentucky's Class I area, please refer to the governing state's regional haze SIP submittal as it becomes available.

7.4 Use of New IMPROVE Equation

During the regional haze SIP development process, the IMPROVE Steering Committee made recommendations for a new IMPROVE equation. Among other things, the new equation includes components that take into account the effects of sea salt and site specific Rayleigh scattering. Additional discussion of the new IMPROVE equation can be found in Appendix C.

VISTAS contracted Dr. Ivar Tombach to develop a post processor to allow CALPOST outputs to be used with the new IMPROVE equation. A discussion of the rationale for use of the new IMPROVE equation follows. The new IMPROVE postprocessor and instructions are included in Appendix L.9.

Rationale for Need for Use of New IMPROVE Equation

The new IMPROVE equation is a much better representation of the effects of particulate matter on light extinction than the old equation and takes into account the latest scientific understanding of several parameters.

1. The new algorithm overcomes biases of the old algorithm on the haziest days and the clearest days as demonstrated by comparing the measured light extinction from nephelometers at Class I areas to light extinction calculated using each of the equations.

2. The new algorithm recognizes spatial and temporal variation in light extinction as size distribution of the aerosol changes by increasing extinction efficiency as sulfate, nitrate and organics concentrations increase.

3. The new algorithm incorporates a term to reflect the contribution of fine sea salt and its hygroscopic growth with increasing relative humidity recognizing research findings showing that fine sea salt can be an important contributor to light extinction in coastal areas.

4. The new algorithm reflects research finding that the mass concentration of particulate organic matter in rural areas is greater than represented by the old equation.

5. The new algorithm includes a NO_2 term to represent times when light absorption by NO_2 is a meaningful contributor to light extinction.

6. The new algorithm incorporates site-specific Rayleigh scattering values to better represent sites close to sea level or with very hot or cold climates.

With this combination of revisions to the IMPROVE equation, the resulting apportionment of extinction to various components is more accurate on the haziest and clearest days. This is important for development of emission control strategies since the benefits of control of concentrations of each species will be represented more correctly with the new algorithm.

Three of Kentucky's BART-eligible sources, Western Kentucky Energy Reid/Henderson station, NewPage Corporation, and Century Aluminum used the new improve equation in their BART exemption modeling. A copy of a request to EPA Region 4 requesting approval of the use of the new improve equation and a letter from EPA granting its approval of the request for these three sources are available in Appendix L.9.

7.5 Conclusion

As reflected in Table 7-1, twenty-one of Kentucky's twenty-six BART-eligible sources were able to demonstrate that they did not cause or contribute to visibility impairment in any Class I area within 300 km of the source. One source used the new IMPROVE equation exclusively in efforts to demonstrate BART exemption. Five Kentucky sources, East Kentucky Power Cooperative (EKPC) Spurlock Station, East Kentucky Power Cooperative (EKPC) Cooper Station, TVA Paradise, American Electric Power (AEP) Big Sandy, and E.ON U.S. Mill Creek Station, as reflected in Table 7-2, were unable to demonstrate a contribution of less than 0.5 dv at all Class I areas within 300 km from their BART-eligible sources, which caused those sources to be considered "subject to BART." These five sources were required to conduct BART determination modeling containing their evaluation of potential BART options and a proposed BART determination. Discussion of the BART determination modeling for these five sources is included in Section 9.0 below.

8. Other Sources Exempted From BART Based on BART Guidelines

The following five KYDAQ sources were determined not to be BART-eligible based on the BART methodology in the BART Guidelines. These sources were discussed with EPA in January 2006. Documentation and correspondence regarding why these sources were not considered BART-eligible sources is available in Appendix L.10.

- Arkema (Formerly Atofina Chemicals)
- E.I. Dupont Inc.
- Cc Metals & Alloys Inc.
- ISP Chemicals Inc.
- Kingsford Manufacturing Co.

9. BART Determinations

For those facilities subject to BART, the state must determine what constitutes BART controls for the source by considering various control options and selecting the best alternative taking into consideration any pollution control equipment in use at the source, the costs of compliance with control options, the remaining useful life of the facility, the energy and non air-quality environmental impacts of compliance, and the degree of improvement in visibility that may reasonably be anticipated to result from the use of such technology. Under Kentucky's approach, sources that are subject to BART were required to conduct BART determination modeling and propose BART controls for the facility while considering the statutory factors.

9.1 BART Subject Sources

Only five BART-eligible sources in Kentucky emit any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I area. The five Kentucky sources, East Kentucky Power Cooperative (EKPC) Spurlock Station, East Kentucky Power Cooperative (EKPC) Cooper Station, TVA Paradise, American Electric Power (AEP) Big Sandy, and E.ON U.S. Mill Creek Station were unable to demonstrate a contribution of less than 0.5 dv at all Class I areas within 300 km from their BART-eligible sources, which caused those sources to be considered "subject to BART." These five sources were required to conduct BART determination modeling containing their evaluation of potential BART control options and a proposed BART determination.

KYDAQ staff reviewed the BART determination modeling and is submitting all five BART determination modeling submittals in this Regional Haze SIP submittal. The five BART determination modeling submittals are available in Appendix L.11. The BART determination modeling results and the proposed BART controls to address condensible particulate emissions are summarized in Table 9-1 and available in Appendix L.12. Applicable BART controls and emission limits will be incorporated into the sources' Title V permit as appropriate or upon renewal. In addition, since TVA had previously indicated to the KYDAQ its plans to install hydrated lime injection controls on TVA Paradise Units 1-3 to mitigate opacity due to SO3 emissions and that additional controls are not cost-effective at this time, the KYDAQ has determined BART to be no control for TVA Paradise Units 1-3. However, as related by TVA, the hydrated lime injection controls for TVA Paradise Units 1-3 will be in place well before the BART controls are required; will achieve the reduction in visibility impacts listed in the Draft Implementation Plan (Kentucky Regional Haze SIP); and will be included in TVA Paradise's Title V permit. Specifically, regarding the installation of hydrated lime injection controls for TVA Paradise Units 1-3, TVA has communicated to KYDAQ its proposed plan that provides for permitting activities to proceed in July 2008; for construction to begin in mid-2009 on Unit 3 with construction for Unit 1 and 2 to follow; and for controls to be operating on all three TVA Paradise units possibly by the fall of 2010. Also, as indicated in the E.ON U.S. Mill Creek BART determination submittal, the average cost for installing sorbent controls on all four Mill Creek units is about the same (an estimated 5.1 million $/dv). However, sorbent injection at all four units would mean an additional total capital investment of $8.8 million as compared to controls only on the larger Units 3 and 4. Therefore, E.ON U.S. concluded that BART should be the installation of sorbent injection controls on the larger Mill Creek Units 3 and 4 since they can achieve an estimated 70 percent of the total dv improvement achieved by controlling all four units. Given the extra cost for the lesser additional dv improvement for Units 1 and 2, the Cabinet agreed that BART for Mill Creek is the installation of sorbent injection controls on the larger Units 3 and 4. Table 9-2 that follows and available in Appendix L.12, in addition to the emission controls, provides the source's BART emission limits and timeframes for compliance.

Table 9-1 Kentucky BART Determination Modeling Results for BART-Subject Sources*					
Source	**Class I Areas**	**BART Controls to Be Installed***	**98th Percentile Impact Before BART Controls (Change in dv)**	**98th Percentile Impact with BART Controls (Change in dv)**	**BART Determination Control Visibility Improvement From 98th Percentile value (Change in dv)**
East Kentucky Power Cooperative (EKPC) Spurlock Station	Mammoth Cave (251 km)	EKPC per a consent decree and for BART will install a wet FGD and wet ESP at EKPC Spurlock Units 1 and 2 that will address condensible particulate emissions and other visibility impairing pollutants.	1.834	0.213	1.621
East Kentucky Power Cooperative (EKPC) Cooper Station	Mammoth Cave (130) km	EKPC per a consent decree and for BART will install a wet FGD and wet ESP at EKPC Cooper Units 1 and 2 that will address condensible particulate emissions and other visibility impairing pollutants.	7.376	0.252	7.124
	Great Smoky Mountains National Park (162 km)		6.763	0.219	6.544
	Joyce Kilmer-Slickrock Wilderness (178 km)		4.974	0.122	4.852
	Cohutta Wilderness Area (221 km)		3.363	0.087	3.276
	Shinning Rock (233 km)		2.022	0.049	1.973
	Linville Gorge Wilderness Area (267 km)		1.885	0.046	1.839
TVA Paradise Fossil Steam Plant**	Mammoth Cave (63 km)	**Although not for BART, TVA previously indicated to KYDAQ its plans to install hydrated lime injection controls on TVA Paradise Units 1-3 to mitigate opacity due to SO3 emissions.	U1- 1.285 U2- 1.285 U3- 1.842 4.412 3.930	0.606 0.606 0.836 2.048 2.048	0.679 0.679 1.006 2.364 1.882
	Mingo (283 km)		U1- 0.251 U2- 0.251 U3- 0.381 0.883 0.865	0.116 0.116 0.166 0.398 0.398	0.135 0.135 0.215 0.485 0.467

Table 9-1 Kentucky BART Determination Modeling Results for BART-Subject Sources*					
Source	**Class I Areas**	**BART Controls to Be Installed***	**98th Percentile Impact Before BART Controls (Change in dv)**	**98th Percentile Impact with BART Controls (Change in dv)**	**BART Determination Control Visibility Improvement From 98th Percentile value (Change in dv)**
American Electric Power Big Sandy Plant (AEP)	Dolly Sods (291 km)	Per a consent decree and BART, AEP will install ammonia injection on Unit 1 and a FGD scrubber on Unit 2 to address condensible particulate emissions and other visibility impairing pollutants.	1.027	0.496	0.531
	James River Face (279 km)		1.052	0.457	0.595
	Linville Gorge (256 km)		0.835	0.364	0.471
	Otter Creek (266 km)		1.285	0.558	0.697
E.ON U.S Mill*** Creek Station	Mammoth Cave (90 km)	***E.ON U.S. for BART will install sorbent injection controls on the larger Units 3-4 to mitigate condensable particulate emissions.	2.265	1.440	0.825

*Existing and expected EGU controls and EPA web links to EKPC and AEP consent decrees are available in Appendix L.8. **Since TVA had previously indicated to the KYDAQ its plans to install hydrated lime injection controls on TVA Paradise Units 1-3 to mitigate opacity due to SO3 emissions and that additional controls are not cost-effective at this time, the KYDAQ has determined BART to be no control for TVA Paradise Units 1-3. ***Given the extra cost for the lesser additional dv improvement for Units 1 and 2, the Cabinet agreed that BART for Mill Creek is the installation of sorbent injection controls on the larger Units 3 and 4.

Table 9-2 Kentucky BART Controls, Emission Limits, and Compliance Timeframes for BART-Subject Sources				
Kentucky BART Subject Source	**BART Controls To Be Installed**	**BART Emission Limits**	**Inclusion in Title V Permit**	**Timeframe for Compliance with BART Emission Limits\Controls**
East Kentucky Power Cooperative (EKPC) Spurlock Units 1 and 2 and Cooper Units 1 and 2	Install wet FGD and wet ESP on Spurlock Units 1 and 2 and Cooper Units 1 and 2.	A 07/02/07 EKPC consent decree provides a filterable PM emission rate of 0.030 lb/MMBTU, which was utilized to demonstrate modeled visibility improvement.	Emission limits and controls will be included in the source's Title V Permit as appropriate or on renewal.	Expeditiously as practicable, but no later than 5 years after EPA approves Kentucky's Regional Haze SIP.
AEP Big Sandy Unit 1 Unit 2	Install ammonia injection controls on Unit 1 and a FGD on Unit 2.	Inorganic Condensible Particulate Limits (modeled as sulfates): 101.0 lb/hr (H2SO4) 127.0 lb/hr (H2SO4)	Emission limits and controls will be included in the source's Title V Permit as appropriate or on renewal.	Expeditiously as practicable, but no later than 5 years after EPA approves Kentucky's Regional Haze SIP. KYDAQ will work with AEP to install the FGD scrubber on AEP Big Sandy Unit 2 as expeditiously as practicable.
TVA Paradise* Unit 1 Unit 2 Unit 3	*Although not for BART, TVA previously indicated to KYDAQ its plans to install hydrated lime injection controls on TVA Paradise Units 1-3 to mitigate opacity due to SO3 emissions.	*NA	*Although not for BART, TVA has indicated that its planned SO3 controls for Paradise Units 1-3 will be included in its Title V Permit as appropriate or on renewal.	*Although not for BART, TVA in its BART Determination has indicated the SO3 controls will be in place on Paradise Units 1-3 well before BART controls are required. Specifically, TVA has related to

Table 9-2 Kentucky BART Controls, Emission Limits, and Compliance Timeframes for BART-Subject Sources

Kentucky BART Subject Source	BART Controls To Be Installed	BART Emission Limits	Inclusion in Title V Permit	Timeframe for Compliance with BART Emission Limits\Controls
				KYDAQ its proposed plan to have hydrated lime injection controls operating on all three TVA Paradise units possibly by the fall of 2010.
E.ON U.S.** Mill Creek Unit 3 Unit 4	**Install sorbent injection controls on larger Units 3 and 4 to control SO3 emissions and continue to utilize existing ESPs to control PM emissions for Units 1 through 4.	Inorganic Condensible Particulate Limits (modeled as sulfates): 64.3 lb/hr (H2SO4) 76.5 lb/hr (H2SO4)	**Emission limits and controls will be included in the source's Title V Permit as appropriate or on renewal.	**Expeditiously as practicable, but no later than 5 years after EPA approves Kentucky's Regional Haze SIP.

*Since TVA had previously indicated to the KYDAQ its plans to install hydrated lime injection controls on TVA Paradise Units 1-3 to mitigate opacity due to SO3 emissions and that additional controls are not cost-effective at this time, the KYDAQ has determined BART to be no control for TVA Paradise Units 1-3. **Given the extra cost for the lesser additional dv improvement for Units 1 and 2, the Cabinet agreed that BART for Mill Creek is the installation of sorbent injection controls on the larger Units 3 and 4.

9.2 Final BART Determinations

After reviewing the sources' BART modeling determinations and considering the statutory factors, KYDAQ staff has concluded that the controls proposed by all the five Kentucky EGU BART-Subject sources are reasonable and appropriate for addressing condensible particulates and their impacts on nearby Class I areas.

9.3 BART Subject Sources in Other States Within 300 km of Kentucky's Class I Area

The authority and responsibility for conducting BART analyses under the regional haze rule lies with the state in which the BART eligible source is located. Sources must conduct an analysis of their impact on any Class I area within 300 km of the source. At this time the VISTAS states are at various points in their processes for addressing BART. For information regarding BART sources outside of Kentucky within 300 km of Kentucky's Class I area, please refer to the governing state's regional haze SIP submittal as it becomes available.

9.4 Conclusions

East Kentucky Power Cooperative (EKPC) Spurlock Station, East Kentucky Power Cooperative (EKPC) Cooper Station, TVA Paradise, American Electric Power (AEP) Big Sandy Plant, and E.ON U.S. Mill Creek Station were all found to be subject to BART. As indicated in Tables 9-1 and 9-2, all of these sources have agreed to install emission controls for BART to address condensible particulate impacts on nearby Class I areas, except the hydrated lime injection controls for TVA Paradise Units 1-3 are not for BART. Based on a review of the BART Modeling Determinations (see Appendix L.11) submitted by the five BART-Subject sources and in consideration of the five statutory factors and applicable consent decrees, KYDAQ agrees with BART emission controls as determined by the BART-Subject sources as provided in Tables 9-1 and 9-2. KYDAQ expects that all the BART determination controls in Tables 9-1 and 9-2 will be in place no later than five years after EPA approves Kentucky's Regional Haze SIP, with the possible exception of the flue gas desulfurization (FGD) scrubber for AEP Big Sandy Unit 2, which per a consent decree is required by December 31, 2015. However, KYDAQ will work with AEP to install the FGD scrubber on AEP Big Sandy Unit 2 as expeditiously as practicable.

10. Kentucky BART Modeling Summary and BART Modeling Files

A summary of the Kentucky BART exemption and BART determination modeling results is available in Appendix L.13. In addition, BART exemption and BART determination modeling files are being made available on a KYDAQ FTP site pursuant to the after hearing submittal of Kentucky's Regional Haze SIP to EPA.

REFERENCES:

1. 40 CFR Part 51 Appendix Y
2. The Quadratic Detection Model" by W. Malm. Appendix D in Acidic Deposition: State of Science and Technology, Report 24, Visibility: Existing and Historical Conditions -- Causes and Effects. National Acid Precipitation Assessment Program, Washington, DC. 1990.
3. Boylan Ph.D., James, 2006, April,VISTAS Joint Tech Analysis-Planning Call. Power Point Presentation: Summary BART_VOC_NH3_PM.ppt.